WHAT IS CLAIMED IS:

1. A surface cleaning method using plasma, for removing a damaged portion and an unwanted oxide layer formed during etching for a contact hole on a silicon substrate having at least one layer including an insulation layer, the method comprising the steps of:

forming a polymer layer on the oxide layer;

removing the polymer layer and the oxide layer by annealing; and

removing the damaged portion of the surface of the silicon substrate.

2. The method of claim 1, the polymer layer formation step comprises the steps of:

forming plasma by introducing a first processing gas containing H_2 or N_2;

passing only radicals to the silicon substrate by filtering the plasma; and

introducing a second processing gas containing a halogen element.

3. The method of claim 2, wherein the second processing gas is at least one of HF, HCl, BCl_3, HBr, and ClF_3.

4. The method of claim 1, wherein the polymer layer and the oxide layer are removed by annealing using a UV lamp or IR lamp.

5. The method of claim 2, wherein the polymer layer and the oxide layer are removed by annealing using a UV lamp or IR lamp.

6. The method of claim 1, wherein the polymer layer and the oxide layer are removed by annealing in a heat chamber.

7. The method of claim 2, wherein the polymer layer and the oxide

layer are removed by annealing in a heat chamber.

8. The method of claim 1, wherein the damaged portion of the silicon substrate surface is removed using remote plasma formed out of a fluorine (F)-containing gas.

9. The method of claim 8, wherein the fluorine-containing gas is at least one of HF/H2, HF/O2, NF3/O2, SF6/O2, and CF4/O2.

10. The method of claim 1, wherein the damaged portion of the silicon substrate surface is removed using remote plasma formed out of a Cl-containing gas.

11. The method of claim 1, wherein the damaged portion of the silicon substrate surface is removed by annealing in a heat chamber.

12. The method of claim 6, wherein the damaged portion removal step is performed in-situ in the same chamber after removing the polymer layer and the oxide layer.

13. The method of claim 7, wherein the damaged portion removal step is performed in-situ in the same chamber after removing the polymer layer and the oxide layer.

14. A surface cleaning method using plasma for fabrication of an integrated circuit in a surface cleaning apparatus having a chamber that can be maintained in a vacuum state, a substrate mount for mounting a silicon substrate, a first processing gas inlet for introducing a carrier gas for generation and maintenance of plasma, a plasma generator, a filter for passing only radicals to

the substrate, and a second processing gas inlet, the method comprising the steps of:

introducing the first processing gas into the chamber;

forming plasma out of the first processing gas in the plasma generator; and

introducing a second processing gas into the chamber.

15. The method of claim 14, wherein the first processing gas contains one of H2 and N2.

16. The method of claim 14, wherein the second processing gas contains a halogen element.

17. The method of claim 14, wherein the second processing gas is at least one of HF, HCl, BCl3, HBr, and ClF3.

18. A surface cleaning method using plasma for fabrication of an integrated circuit in a surface cleaning apparatus having a chamber that can be maintained in a vacuum state, a substrate mount for mounting a silicon substrate, a first processing gas inlet for introducing a carrier gas for generation and maintenance of plasma, a plasma generator, a filter for passing only radicals to the substrate, a second processing gas inlet, and a third processing gas inlet for introducing a third processing gas to maintain the environment of the chamber constant after processing each wafer, the method comprising the steps of:

introducing the first processing gas into the chamber;

forming plasma out of the first processing gas in the plasma generator;

introducing a second processing gas into the chamber; and

introducing the third processing gas into the chamber to maintain the environment of the chamber constant after processing each wafer

19. The method of claim 18, wherein the first processing gas contains one of H2 and N2.

20. The method of claim 18, wherein the second processing gas contains a halogen element.

21. The method of claim 18, wherein the second processing gas is at least one of HF, HCl, BCl3, HBr, and ClF3.

22. The method of any of claims 18 to 21, wherein the third processing gas contains at least of H, F, O and N.

23. A surface cleaning apparatus using plasma, comprising:

a chamber that can be maintained in a vacuum state;

a substrate mount in the chamber, for mounting a silicon substrate;

a first processing gas inlet for introducing a carrier gas into the chamber to generate and maintain plasma;

a plasma generator for forming plasma out of the first processing gas;

a filter between the plasma generator and the substrate mount, for passing only radicals to the substrate; and

a second processing gas inlet between the plasma generator and the filter, for introducing a second processing gas into the chamber.

24. The apparatus of claim 23, wherein the plasma generator uses a microwave generator as an energy source for plasma generation.

25. The apparatus of claim 23, further comprising a wall heat jacket for maintaining the walls of the chamber at a predetermined temperature to prevent

the radicals from sticking to the walls of the chamber and forming a byproduct layer and to concentrate the radicals on the surface of the silicon substrate.

26. The apparatus of claim 23, wherein the filter is grounded.

27. The apparatus of claim 23, wherein the filter is a grid to which an AC voltage is applied.

28. The apparatus of claim 23, wherein the first processing gas contains one of H2 and N2.

29. The apparatus of claim 23, wherein the second processing gas is at least one of HF, HCl, BCl3, HBr, and ClF3.

30. The apparatus of claim 23, further comprising a third processing gas inlet for introducing a third processing gas into the chamber to maintain the environment of the chamber constant after processing each wafer.

31. The apparatus of claim 30, wherein the third processing gas contains at least of H, F, O and N.